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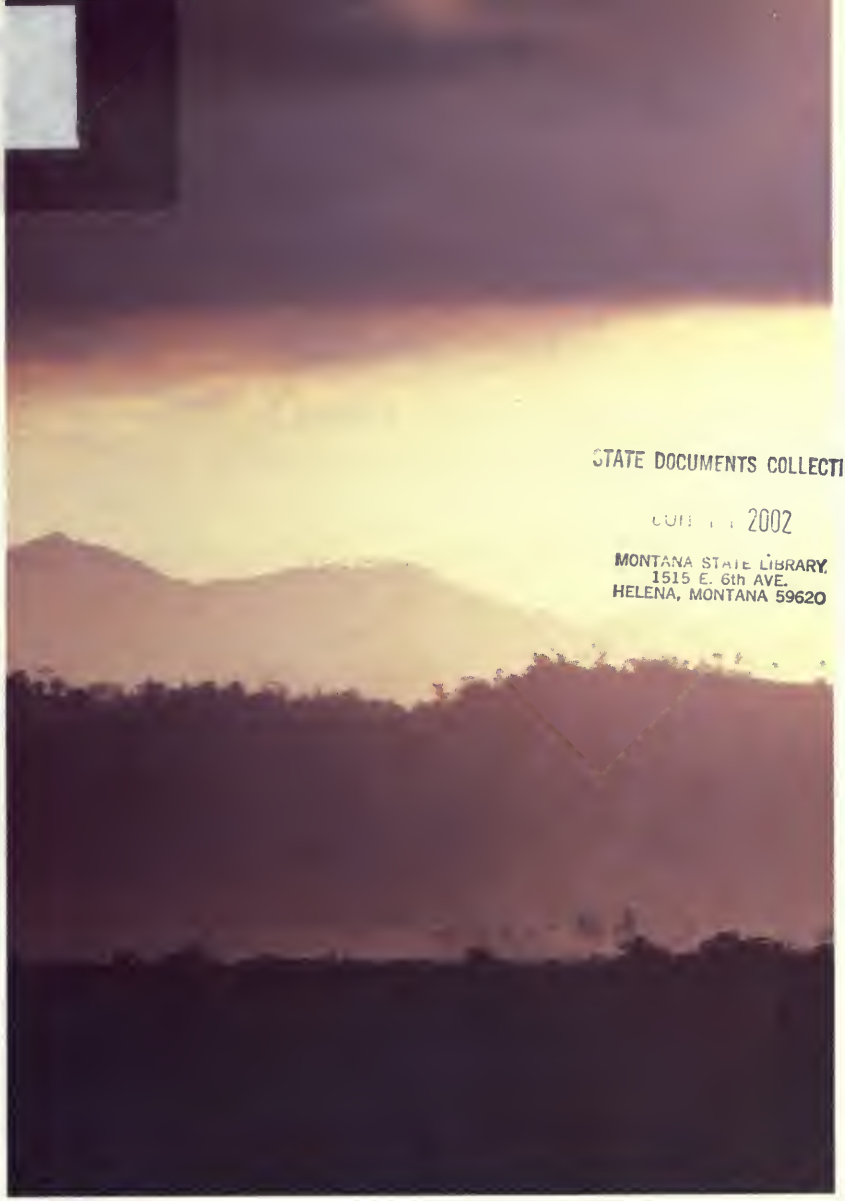

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Montana's Coal Industry

facing an uncertain future

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Montana's Coal Industry
facing an uncertain future

A report prepared for the

Montana International Trade Commission

by

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MONTANA'S ECONOMY AND THE COAL INDUSTRY

Montana's Economy in General

The Montana economy, after suffering through the worst recession since World War II from 1979 to 1982, has seen some improvement in 1983 and 1984. The outlook for 1985 and 1986 is for continued economic growth, but at rates below those of 1984 (figures 1-4). In the long run, however, things do not look as optimistic. Montana has suffered serious job losses in its important industries, and these jobs are not likely to be replaced in the near future.

Current conditions and short-run forecasts

The conditions for 1984 contrast sharply to those for the first few years of the decade. The Montana economy suffered through a very long and severe recession between 1979 and 1982. It was, in fact, the longest and most severe recession in Montana during the postwar period. The recovery began late in 1982 and proceeded very slowly. The upward trend was barely noticeable during 1983. Therefore, the strong performance in 1984 is particularly welcome.

The outlook for 1985 and 1986 is slightly less optimistic. There will be slower growth in income and employment accompanied by a modest upward trend in unemployment. But, no new recession is forecast.

The long-run outlook

Despite its improved performance during 1984, a closer look at several of the general economic indicators reveals the disturbing fact that Montana's economy has not yet regained its prerecession levels. Nonfarm labor income and nonfarm wage and salary employment are not projected to reach their 1979 levels until sometime during 1985.

Montana has suffered a significant decline in its economic base. Since 1979, Montana has suffered permanent job losses in its basic industries, including the following:

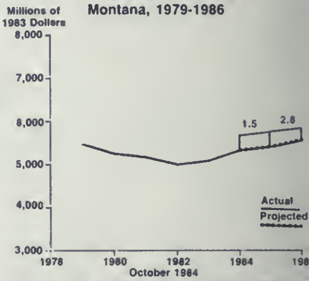
- the loss of a transcontinental railroad (The Milwaukee Road)
- the closure of primary metals refineries in Great Falls and Anaconda
- the shutdown of a large plywood plant and sawmill in Missoula
- the closure of all Anaconda mining operations in Butte
- the loss of Burlington Northern railroad jobs due to reorganization and automation

The cumulative impact of these shutdowns and closures accounted for the loss of about 7,000 jobs—one-half of the decline in nonfarm wage and salary employment between 1979 and 1983 (table 1). This means that a large component of the decrease in basic industries is a permanent loss and will not return when the economy recovers.

There may be further declines in the basic industries, including wood products and primary metals refining. Wood products firms in Montana face a changing timber supply situation and must incorporate new technologies and make significant capital investments if they are to survive during the coming decade. The new facilities and production processes will require less labor. ARCO is currently trying to sell its aluminum refinery at Columbia Falls, which has been described as inefficient compared to other facilities. If a new owner is not found, the refinery may be closed.

Prospects for new basic industries are limited. There will be more new small mines, producing mostly gold and silver. Further expansion of nonresident travel and tourism is likely. Some new small manufacturing plants probably will be located in the state. But the

Figure 1
Nonfarm Labor Income
Montana, 1979-1986

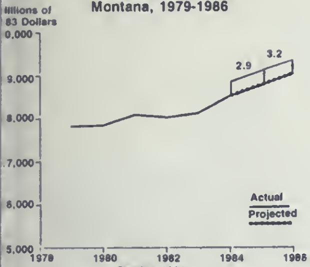


Sources: U.S. Department of Commerce, Bureau of Economic Analysis; University of Montana, Bureau of Business and Economic Research, Montana Economic Reporting and Forecasting System; and Chase Econometrics.

Nonfarm labor income. *Nonfarm labor income consists of the wages and salaries, proprietors' income, and certain fringe benefits of all working persons, except those working on farms and ranches. It is the labor income of all working persons (except those in agriculture) engaged in the current production of goods and services. Nonfarm labor income is a particularly useful index of economic conditions because it measures payments to workers; in most areas there is a high correlation between economic activity and the amount of labor required to produce it. In other words, changes in nonfarm labor income provide an approximate equivalent for changes in GNP, a statistical series not available for Montana.*

- **The 1979-1982 recession in Montana was the longest and most severe since World War II.**
- **Montana's economy began to recover in 1983.**
- **The growth in 1984 was the greatest since 1979.**
- **Montana's economic growth will slow to 1.5 percent in 1985 and 2.8 percent in 1986.**

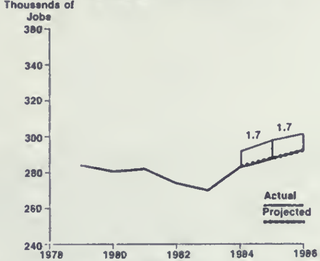
Figure 2
Total Personal Income
Montana, 1979-1986



October 1984

Sources: U.S. Department of Commerce, Bureau of Economic Analysis; University of Montana, Bureau of Business and Economic Research, Montana Economic Reporting and Forecasting System; and Chase Econometrica.

Figure 3
Nonfarm Wage and Salary Employment
Montana, 1979-1986



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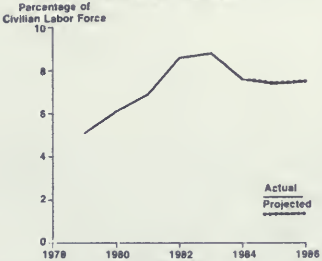
Sources: Montana Department of Labor and Industry; University of Montana, Bureau of Business and Economic Research, Montana Economic Reporting and Forecasting System; and Chase Econometrica.

Figure 4
Unemployment
Montana, 1979-1986



October 1984

Sources: Montana Department of Labor and Industry; University of Montana, Bureau of Business and Economic Research, Montana Economic Reporting and Forecasting System; and Chase Econometrica.

tal personal income. *Personal income the income received by Montanans. It lu[illegible]bor income, transfer payments d dividends, interest, and rents. rsonal income does not include personal tributions for Social Security, and has n adjusted for persons who work in one te but live in another. Personal income asures the ability of Montanans to rchase clothing, food, and other isumer items. Therefore, forecasts of al personal income may be of particular erest to retailers and others concerned th consumer spending.*

- **Personal income did not decrease between 1979 and 1983 because of transfer payments and dividends, interest, and rents.**
- **Personal income grew 4.9 percent in 1984.**
- **Growth is projected to be 2.9 percent in 1985 and 3.2 percent in 1986.**

Nonfarm wage and salary employment. *Nonfarm wage and salary employment includes all jobs in Montana except those in agriculture and the self-employed (which includes farm and ranch proprietors). Even though some workers are not counted, nonfarm wage and salary employment provides a reliable indicator of short-run changes in the job market and job opportunities in Montana. Nonfarm wage and salary employment measures an economy's ability to provide jobs for its residents.*

- **Nonfarm wage and salary jobs increased in 1984.**
- **There will be less growth in 1985 and 1986.**

The unemployment rate. *The unemployment rate measures the percentage of the civilian labor force that is currently unemployed. It includes those persons looking for and available to take a job, or waiting to be called back to a job from which they have been laid off. The unemployment rate does not include "discouraged workers," those persons who are no longer looking for work because they couldn't find a job.*

- **Unemployment dropped sharply in 1984.**
- **Unemployment has been a "lagging indicator," decreasing only after other economic indicators signal improvement in the economy.**

employment and income associated with these potential additions are small when compared to the past and potential future losses in basic industries. Roughly 7,000 jobs were permanently lost between 1979 and 1983 in mining, manufacturing and railroads, and these positions were among the best paying in Montana (table 1). It would require many new gold or silver mines (which employ, at most, 300 to 400 persons) or small manufacturing plants to counterbalance these permanent losses. Nonresident travel and tourism jobs are classified in the retail trade and service industries, and are not well-paying (figure 6.)

Basic or export industries. *Industries which produce goods or services mostly for sale outside the state or region or are influenced by events occurring outside the area. Montana's basic or export industries include agriculture; manufacturing, including wood products, paper, and primary metals; mining; heavy construction; railroads; the federal government; and tourism. The labor income of persons working in basic industries represents net injection of new funds into an area. This creates additional income (in the derivative industries) as those funds are spent and respent.*

Derivative industries. *Industries which serve the local population. These include retail and wholesale trade; most services; financial institutions; insurance and real estate agencies; transportation companies except railroads; construction except heavy construction; public utilities; and state and local government.*

Table 1

Change in Number of Nonfarm Wage and Salary Jobs
Montana
1979-1983

	1979	1983	Change
All nonfarm industries	283,900	269,900	-14,000
Basic industries	69,800	56,500	-13,300
Mining	7,700	7,000	-700
Metal	2,100	1,300	-800
Coal	1,300	1,300	———
Oil and gas	3,400	3,600	200
Nonmetallic	900	800	-100
Heavy construction	4,000	4,100	100
Manufacturing	27,000	20,900	-6,100
Wood products & paper	11,800	8,700	-3,100
Primary metals	3,300	1,200	-2,100
Other	11,900	10,900	-1,000
Railroads	7,400	4,100	-3,300
Federal government	23,700	20,400	-3,300
Civilian	13,900	12,500	-1,400
Military	9,800	7,900	-1,900
Derivative industries	214,100	213,400	-700

Source: Montana Department of Labor and Industry, Helena.
Note: Details may not add due to rounding.

The Contribution of Coal Mining to Montana's Economy

Coal mining is a significant component of Montana's economy. The approximately 1,300 jobs it provides equal 1.4 percent of total employment in Montana's basic industries. The $53 million in labor income, however, amounts to 3.6 percent of the total for basic industries (figure 5). These figures understate the contribution of coal mining because they exclude the railroad workers hauling coal in unit trains and other persons directly supplying equipment and services to the coal mines. And because mining activity is concentrated in southeastern Montana, it is of much greater importance there. The income and employment figures do not take into account the $83 million in coal severance tax collection.

Coal mining jobs in Montana pay well. The average Montana coal miner earned almost $35,000 in wages and salaries during 1983 (figure 6). Coal mining jobs provide a steady source of employment. They are year-round jobs and are less affected by national business cycles than employment in some other basic industries in the state.[1]

Some Montana coal miners live in Wyoming. They still contribute to Montana's economy because their earnings are taxed in Montana and they may shop in Billings. In addition, Sheridan merchants may be supplied by Billings wholesalers. This means that even though these workers live out of state, many of the dollars they earn are injected into the Montana economy.

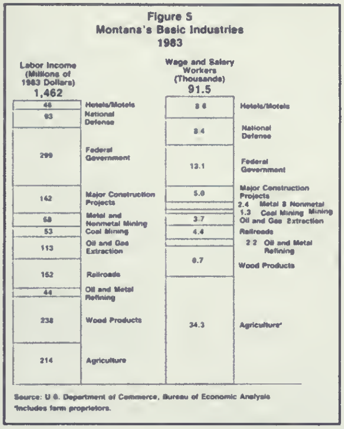


Figure 5
Montana's Basic Industries
1983

Source: U.S. Department of Commerce, Bureau of Economic Analysis
*Includes farm proprietors.

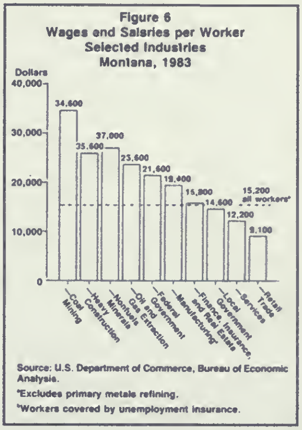


Figure 6
Wages and Salaries per Worker
Selected Industries
Montana, 1983

Source: U.S. Department of Commerce, Bureau of Economic Analysis.
^a Excludes primary metals refining.
^b Workers covered by unemployment insurance.

Montana's Basic Industries

Their contribution to the state's economy may be measured using employment or labor income

Agriculture is Montana's largest basic industry

- **Agricultural incomes and profits have been depressed in recent years**
- **During normal times, farms and ranches account for about one-third of Montana's economic base**

There is a three-way tie for second place among Montana's basic industries.

Wood products
- **Primarily located in western Montana**
- **10.6 percent of total basic employment**
- **16.3 percent of labor income earned in basic industries**

Civilian federal government
- **Many workers manage federal lands and resources**
- **14.3 percent of basic employment**
- **20.4 percent of labor income in basic industries**

Mining, which consists of three components

Metal and nonmetal mining
- **Makes up 2.6 percent of basic employment and**
- **4.6 percent of labor income earned in the basic industries**

Oil and gas extraction
- **Makes up 4.0 percent of basic employment and**
- **7.7 percent of labor income earned in the basic industries**

Coal Mining
- **Makes up 1.4 percent of basic employment and**
- **3.6 percent of labor income earned in the basic industries**

- **Coal miners are among the best paid workers in Montana**
- **Wages and salaries per worker are more than double the average for all workers**

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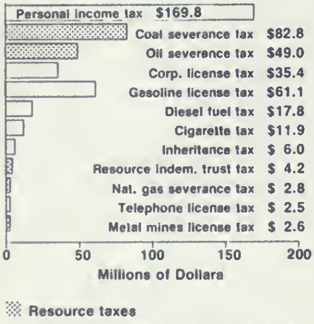
[1] The demand for electricity is certainly affected by business cycles and the weather. Apparently, Montana coal is used in "base load" generating plants, and is less affected by these factors.

Montana's Coal Severance Tax

I. Montana has traditionally taxed the extraction of its natural resources. The current coal severance tax was enacted in 1975. It has a variable rate depending on the heating value (BTU) of the coal mined and whether it was mined by surface or underground method. Since most Montana coal currently being extracted is surface mined and has heating quality greater than 7,000 BTU per pound, the tax rate is 30 percent of its value.

II. The coal severance tax is the second largest tax collected by Montana state government, second only to the personal income tax.

Preliminary Montana Department of Revenue Collections Fiscal Year 1983-84



Source: Montana Department of Revenue.

Heating Quality (BTU/pound of coal)	Surface Mining	Underground Mining
	The greater of	*The greater of*
Under 7,000	$0.12 or 20% of value	$0.05 or 3% of value
7,000-8,000	$0.22 or 30% of value	$0.08 or 4% of value
8,000-9,000	$0.34 or 30% of value	$0.10 or 4% of value
Over 9,000	$0.40 or 30% of value	$0.12 or 4% of value

III. But not all revenue from the coal severance tax is available to state government. The allocation of coal tax collection is as follows:

1984 Fiscal Year Collections

$41,411,716	1.	50 percent to permanent coal tax trust fund. The interest from this constitutional trust fund may be appropriated by the legislature each session, but its principal is "inviolate" unless three-quarters of the members of each house vote for its appropriation.
$15,736,452	2.	19 percent to the state general fund. This amount is available for unrestricted spending.
$ 8,282,343	3.	10 percent to the education trust fund. Of the interest earned on the trust, 67.5 percent goes into the state public school equalization program, 22.5 percent to the Board of Regents for the university system, and 10 percent is reinvested in the trust.
$ 7,247,050	4.	8.75 percent to the local impact account to be allocated by the Montana Coal Board.
$ 4,141,171	5.	5 percent to the state public school equalization program.
$ 1,863,527	6.	2.25 percent to the alternative energy research, development, and demonstration account. The Montana Department of Natural Resources and Conservation awards grants and loans from this account.
$ 2,070,586	7.	2.5 percent to a parks acquisition and cultural projects trust fund.
$ 1,035,293	8.	1.25 percent to the renewable resource development account for loans and grants to government units for projects that will develop Montana's renewable resources.
$ 414,117	9.	0.5 percent to the State Library Commission to provide basic library services to all counties and to pay participation costs in information networks.
$ 414,117	10.	0.5 percent to counties for land planning projects.
$ 207,059	11.	0.25 percent to conservation district operations.
$82,823,431	Total	

Since it was enacted in 1975, Montana coal producers have paid a total of about $523 million in coal severance taxes.

The above information on the coal severance tax was obtained from *Montana Energy Almanac*, Montana Department of Natural Resources and Conservation.

A DESCRIPTION OF MONTANA'S COAL PRODUCERS

Coal Production Since 1970

There are only a few coal producers in Montana and they are mostly located about one hundred miles southeast of Billings (figure 7). Their output increased from about 1.3 million tons in 1970 to 33.3 million tons in 1981 (figure 8). After the rapid growth during the 1970s, production fell to 27.8 million tons in 1982 and 28.7 million tons in 1983.

The rapid growth of coal production was the result of contracts which were signed in the early 1970s. Since 1975, only one new firm (Spring Creek Coal Company) has opened a major mine in Montana. Although the contract with Spring Creek Coal Company was signed in 1978 and deliveries began in 1980, the original letter of intent and other negotiations were completed prior to 1975. Among older operating companies, only four major coal contracts have been signed since 1975: two contracts with Michigan utilities, which total less than one million tons per year, and two contracts with The Montana Power Company, for the Corette plant in Billings and Colstrip 3 and 4. Even for these contracts, most of the negotiations and commitments were completed prior to 1975.

During 1983, five firms had production in excess of two million tons. Two firms (Decker Coal Company and Western Energy Company) accounted for almost 69 percent of Montana's 1983 coal production.

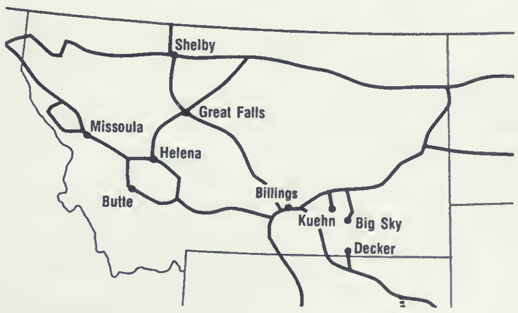
What Happened to Montana's Coal Boom?

Despite its rapid growth, Montana coal production has not reached the levels some well-publicized forecasts had suggested. For example, one federal study published in 1975 predicted that Montana coal production would be between 34 and 64 million tons in 1980 and from 39 to 153 million tons in 1985.[1] As recently as 1979, a federal-state study projected Montana coal production to be 39.3 million tons in 1980 and 49.7 million tons in 1985.[2]

Both forecasts were too high for 1980, when output actually amounted to 30.0 million tons. Since then, Montana's coal production has declined. Output during 1983 was 28.7 million tons (figure 8), and 1984 production will also fall short of the projections.

The demand for western coal has been affected by several events in the last decade and the assumptions

Figure 7
Location of Major Montana
Coal Mines
1984



Most Coal Produced by Five Mines
1983

	Firm	Millions of Tons	*Percentage of Total*
(1)	Decker Coal Co.	10.3	*35.9*
(2)	Western Energy Co.	9.5	*33.1*
(3)	Westmoreland Resources, Inc.	3.9	*13.6*
(4)	Peabody Coal Co.	2.6	*9.1*
(5)	Spring Creek Coal Co.	2.1	*7.3*
(6)	Knife River Coal Mining Co.	0.2	*0.7*
(7)	Other	0.1	*0.3*
	Total	28.7	*100.0*

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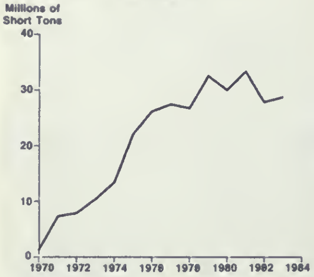
[1] Northern Great Plains Resource Program, *Effects of Coal Development in the Northern Great Plains* (Denver, Colorado, 1975), p. 40.

[2] U.S. Department of the Interior and Montana Department of State Lands, Draft Environmental Statement, Regional Analysis, Northern Powder River Basin Coal, Montana, 1979, pp. 1-3.

underlying the earlier forecasts are no longer valid.

Figure 8
Montana Coal Production
1970-1983



Source: Montana Coal Council.

Demise of synthetic fuels

The Arab oil boycott of 1973 and the resulting "energy crunch" during the late 1970s led to numerous proposals to use western coal to produce synthetic natural gas and other fuels. Synthetic fuel plants use large quantities of coal and are usually located at the mine site. The high coal production projections made by the federal government assumed that several synthetic fuel plants would be operating in Montana by 1980.

Even though one plant has been developed and experimental work on synthetic fuels is proceeding at several sites in the United States, none is in Montana. The prospects are poor for commercial synthetic fuel production because of ever-increasing costs of building the plants and the recent moderation in worldwide energy price increases. Only extensive government subsidies, which appear unlikely at this time, would alter this outlook.

A number of potential synthetic fuel plant sites have been identified in Montana. But no applications have been received and there are no indications of imminent development at any site.

Changes in air pollution regulations

During the early 1970s, federal legislation limited the amount of sulfur-dioxide (SO_2) which coal-fired electric generating plants could release into the atmosphere. Many utilities complied with these regulations by switching to certain types of low-sulfur western coal. Only the Montana coal deposits located near Decker (the Decker and Spring Creek mines) and the Wyoming coal deposits in the Sheridan and Gillette areas have the low-sulfur content needed to comply with these standards—and have been dubbed "compliance coal."

New federal regulations require that all coal-fired generating plants proposed after 1978 must remove a fixed percentage of the sulfur dioxide produced regardless of the sulfur content of the coal. The impact of these new regulations is to require new generating plants to have "scrubbers" even if they burn low-sulfur coal. In other words, the attractiveness of "compliance coal" has been significantly reduced.

Moderating growth in demand for electricity

The growth of U.S. demand for electricity is an important determinant in the demand for Montana coal. After World War II, the U.S. demand for electricity roughly doubled every ten years. Beginning in the mid-1970s, however, the growth rate began to moderate. The slower demand growth, combined with the long lead time associated with planning, permitting, and constructing generating plants, has led to the widely-publicized current glut of electric capacity.

The declining U.S. growth rate for electricity use was caused by two factors:

Rising real price of electricity. The rapid postwar growth in U.S. electricity demand was fueled by declining real (constant dollar) prices for electricity. After 1973, adjusting for inflation, the price of electricity began to rise. Electricity prices went up first because of the "energy crisis," which raised certain fuel costs, and then by the escalating capital costs associated with building new generating capacity. The rising real price of electricity led to conservation efforts by residential and industrial users, resulting in lower consumption of electricity and/or substitution of other forms of energy. Recently, the nationwide upward trend in real electricity prices has moderated.

The 1979-1982 business cycle. Even though price increases moderated, electricity consumption continued to languish because of the severe recessions experienced by the U.S. economy during the 1979 to 1982 period. The economic recovery began late in 1982 and increased economic activity appears to have raised growth rates in the U.S. demand for electricity. The recent growth rates for the midwestern states, which include much of Montana's coal market area, appear to be above the national average.

MONTANA'S COAL MARKET AREA

Determinants of the Market Area

Montana coal is almost exclusively burned as boiler fuel to generate electricity. Although significant amounts are burned by instate generating plants—primarily at Colstrip—most Montana coal is shipped via unit railroad trains to the Midwest.

The demand for Montana coal, and other forms of boiler fuel, is determined by the delivered price per unit of energy. Because of the large volume of coal used and the long service life of generating plants, utilities have a strong incentive to obtain the cheapest fuel. For example, a $0.50 per ton reduction in the delivered price of coal would mean an annual savings of $1.5 million for a "typical" generating plant using 3 million tons of coal per year—or about $45 million over the thirty-year service life of the facility (not considering inflation or alternative investments).

The delivered price of fuel to a generating plant is determined by many complex and subtle factors resulting from extensive negotiations between the mine, the utility, and the railroad. With three major assumptions, however, a rough approximation of Montana's coal market may be identified.

Assumption #1. Montana coal competes with Wyoming and Illinois coal in midwestern states, with eastern coal in the Great Lakes states, and with Wyoming and Utah coal in the Pacific Northwest.

Assumption #2. The FOB mine prices (including severance taxes) are shown at the top of the next column.

Area	FOB Mine Price ($/Ton)	Comment
Montana-North	$ 9.75	Increased production may be obtained from existing mines due to overcapacity.
Montana-South	12.00	Increased production may be obtained from existing mines due to overcapacity.
Wyoming-Gillette	6.40	Increased production may be obtained from existing mines due to overcapacity.
Illinois-Springfield	30.00	Surface mines are at capacity. New production will come from underground mines.

Assumption #3. Montana and Wyoming coal is shipped via the Burlington Northern Railroad at $0.02 per ton mile. Rail costs for Illinois coal are $0.025 per ton mile for the congested short-mileage movements within Illinois, and $0.02 per ton mile outside Illinois. These costs may be slightly above existing rates. The sketchy and incomplete information that is available suggests an upward trend in rail rates since the late 1970s. Much of this rise may have been caused by inflation.

These assumptions, combined with the characteristics of Montana, Wyoming, and Illinois coal (table 2), allow the calculation of the least-cost coal delivered to various locations. For example, Montana is the source of cheapest delivered coal for electric generating plants in Minneapolis, while utilities in Omaha would purchase Wyoming coal (tables 3 and 4).

A market region which includes the areas for which Montana is the least-

Table 2

Montana, Wyoming, and Illinois Coal: A Comparison

Mining Area	Heat Content[1] (BTU/LB)	*Ash[1] (Percent)*	*Sulfur[1] (Percent)*
Montana North (Western Energy, Westmoreland, Peabody mines)	8,600	*10.0*	*0.8*
Montana South (Decker, Spring Creek mines)	9,300	*6.0*	*0.4*
Wyoming—Gillette	8,300	*6.0*	*0.5*
Illinois—Springfield	10,500	*13.0*	*3.5*

[1] Averages for specific sites.

Coal-fired generating plants are designed to burn coal with specific characteristics. For example, Illinois coal may require smaller, less expensive boilers than Montana and Wyoming coal because of the differences in BTU content. On the other hand, greater capital expenditures are required to remove the ash and sulfur present in the Illinois coal. As a rough approximation, we have assumed that Illinois coal requires additional capital and operating costs of about $0.10/mm BTU relative to Montana and Wyoming coal.

Montana coal from the Decker and Spring Creek mines and the Wyoming coal from the Gillette area are "compliance coals." That is, they are low in sulfur and may be burned in plants built as planned between 1970 and 1978 to comply with federal regulations.

cost source of coal is derived by repeating for a number of locations the calculations shown in tables 3 and 4. As shown in figure 9, this market region includes northern Idaho, Washington, and northern Oregon along the Columbia River. To the east, North Dakota (excluding minemouth plants using lignite), most of Minnesota, Wisconsin, and lakeside plants on the Great Lakes which can be served via Duluth/Superior are in Montana's market area. In general, Montana's market area is bounded on the south by Wyoming and to the southeast by the Illinois market area. Along the Great Lakes, only sites which can be served directly by large freighters are in Montana's market area.

Table 3

Comparative Cost of Coal Delivered to Minneapolis, Minnesota
November 1984

Coal Source	FOB Mine Price ($/ton)	+ Transportation Cost	= Delivered Price ($/ton)	÷ Heat Content (mm BTU/ton)	= Gross Delivered Price ($/mm BTU)	+ Quality Adjustment ($/mm BTU)	= Effective Delivered Price ($/mm BTU)
MT-North	$ 9.75	788 miles @ $0.020/mi. = $15.76	$25.51	17.2	$1.48	$0.00	$1.48
WYO-Gillette	6.40	1,062 miles @ $0.020/mi. = 21.24	27.64	16.6	1.67	0.00	1.67
ILL-Springfield	30.00	181 miles @ $0.025 mi. = 4.53					
		401 miles @ $0.020/mi. = 8.02					
		Total $12.55	$42.55	21.0	$2.03	$0.10	$2.13

Table 4

Comparative Cost of Coal Delivered to Omaha, Nebraska
November 1984

Coal Source	FOB Mine Price ($/ton)	+ Transportation Cost	= Delivered Price ($/ton)	÷ Heat Content (mm BTU/ton)	= Gross Delivered Price ($/mm BTU)	+ Quality Adjustment ($/mm BTU)	= Effective Delivered Price ($/mm BTU)
MT-North	$ 9.75	1,041 miles @ $0.020/mi. = $20.82	$30.57	17.2	$1.78	$0.00	$1.78
WYO-Gillette	6.40	665 miles @ $0.020/mi. = 13.30	19.70	16.6	1.19	0.00	1.19
ILL-Springfield	30.00	130 miles @ $0.025 mi. = 3.25					
		266 miles @ $0.020/mi. = 5.32					
		Total $ 8.57	$38.57	21.0	$1.84	$0.10	$1.94

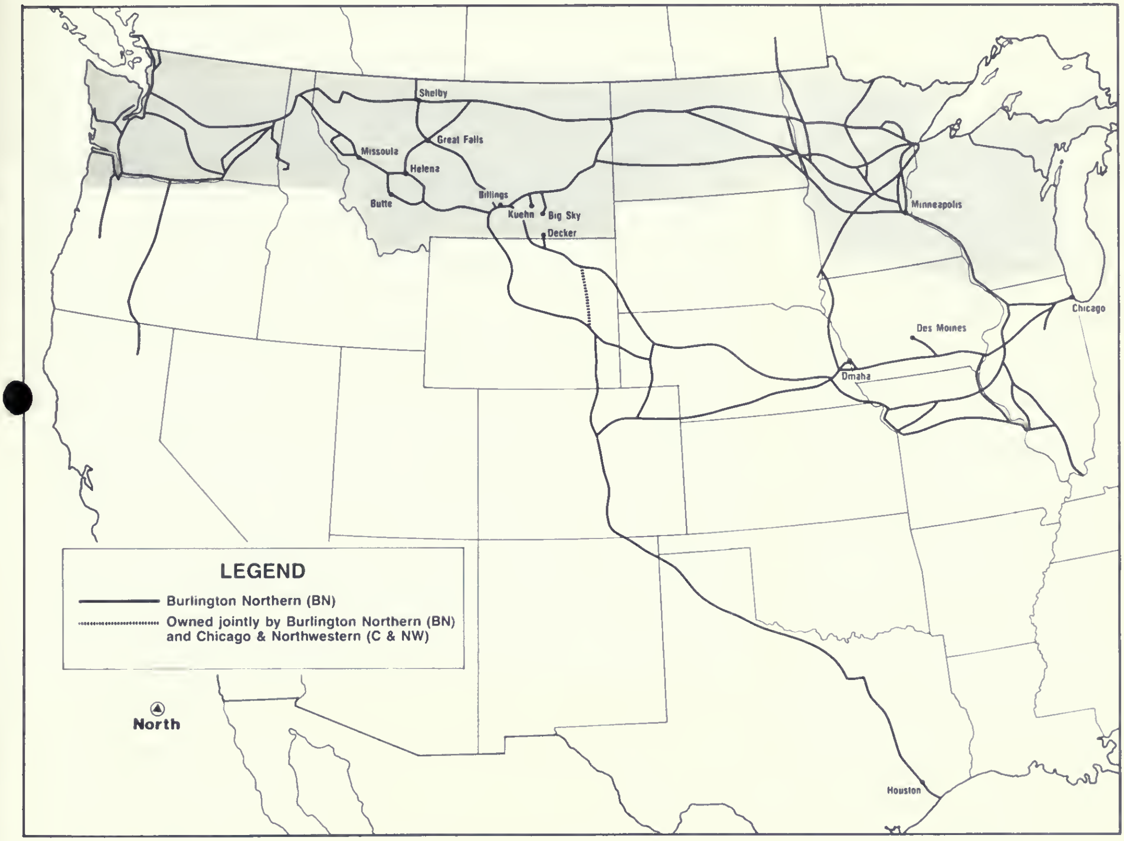
Derivation of least cost source of coal:

Step 1. Determine delivered price by adding the FOB mine price and transportation costs.

Step 2. Adjust for differences in heat content by dividing delivered price by BTU per ton of coal. For example, using Montana-North coal, the heat content of 8,600 BTU/lb. (table 3) is equivalent to 17.2 million BTU/ton.

Step 3. Adjust for quality differences because Illinois coal requires additional capital and operating costs of about $0.10 per million BTU.

Figure 9
Montana's Coal Market Area
1984



Confirmation of the Market Area

Montana's coal market area was derived using a number of basic, simple assumptions. Only three of the eighteen major contracts with Montana coal mines call for shipments outside the designated market area (table 5). Each of these three exceptions may be attributed to special circumstances:

- Shipments to Chicago, Illinois. The Commonwealth Edison Company has contracted with several Montana and Wyoming mines for "compliance coal," which is blended with other coal to meet local emission requirements.
- Shipments to Austin and Houston, Texas. Due to timing of contracts, Montana mines could offer a favorable price. Because of its higher heat content, Montana-South coal may be cost effective vis-a-vis Wyoming-Gillette coal for sites far away.

As further confirmation of Montana's coal market area, there are only a few sales of Wyoming coal within its borders—four contracts with Wisconsin utilities and one contract to an electric generating plant along the Columbia River in Oregon. Here, too, there were extenuating circumstances. These electric generating plants were designed to burn "compliance coal" and, given their locations, Wyoming mines were the least-cost source.

Table 5

Major Coal Contracts
by Mining Firm, Purchaser, and Destination
November 1984

Mining Firm, Purchaser, and Date of Contract	Destination
Decker Coal Co.	
Commonwealth Edison Co. (1974)	Chicago, Illinois
Detroit Edison Co. (1973)	Detroit, Michigan via Superior, Wisconsin
Lower Colorado Valley Authority (1974)	Austin, Texas
Knife River Coal Co.	
Montana-Dakota Utilities (1973)	Sidney, Montana
Peabody Coal Company	
Minnesota Power and Light (1968)	Northern Minnesota
NERCO Coal Company (Spring Creek)	
Utility Fuels, Inc. (1978)	Houston, Texas
Western Energy Company	
Upper Peninsula Generating Co. (1977)	Northern Michigan via Superior, Wisconsin
Montana Power Company and others for Colstrip 1 and 2 (1971)	Colstrip, Montana
Montana Power Company and others for Colstrip 3 and 4 (1980)	Colstrip, Montana
Montana Power Company (1980)	Billings, Montana
Lake Superior District Power Company (1974)	Northern Wisconsin
Northern States Power Company (1972)	Minneapolis, Minnesota
Wisconsin Power and Light Company (1972)	Southern Wisconsin
Westmoreland Resources, Inc.	
Northern States Power Company (1972)	Minneapolis, Minnesota
Dairyland Power Cooperative (1972)	Southwest Wisconsin
Wisconsin Power and Light Company (1972)	Southern Wisconsin
Interstate Power Company (1972)	Northern Iowa
Upper Peninsula Generating Company (1977)	Northern Michigan via Superior, Wisconsin

THE OUTLOOK FOR MONTANA COAL PRODUCTION

This section examines the outlook for Montana's coal industry. We will present likely trends in coal production to 1993 using as a guide the current contracts for Montana coal and the planned addition to generating capacity of utilities in Montana's market area. We will also look at factors affecting the long-run outlook for Montana's coal industry, but no precise forecasts will be presented.

Current Contracts

The existing contracts for Montana coal call for production to rise about 6 million tons between 1983 and 1987, from 29 million tons per year to approximately 35 million tons per year. About 3.6 million tons of this increase can be attributed to the Colstrip 3 and 4 generating plants, which are scheduled to be in full operation by 1987. The remaining 2.4 million tons per year are due to increases in production associated with existing contracts—the long delayed first two units of the new Belle River plant owned by the Detroit Edison Company. From 1987 to 1993, current contracts call for a relatively stable level of coal production—assuming the contracts scheduled to expire in 1989 and 1991 are renewed.

Forecasts based on existing coal contracts must be interpreted cautiously. Most contracts stipulate a maximum and a minimum of coal which may be shipped in any one year; this allows considerable flexibility to adjust the amount purchased in specific years. The coal tonnages reported in table 6 are, for the most part, midpoints between the maximums and minimums and may not reflect the precise amounts purchased during a particular year.

In summary, current contracts for Montana's coal suggest that production will rise to about 35 million tons during the next few years, and then remain at this level until 1993. There is, however, the possibility that certain Montana coal customers might reduce their purchases to less than the amounts specified in existing contracts.

New Generating Plants

Two new coal-fired generating plants within Montana's coal market area are currently on the drawing boards. One is now under construction north of Minneapolis, and is scheduled to be in operation early in 1988. The other is in the early planning stages; it could be located in northern or central Wisconsin and has a tentative completion date of mid-1993. Even though both plants are currently within Montana's coal market area it does not mean that these contracts are a "sure thing"—we will have more to say about this possibility later. We have, however, included in Montana's forecast an additional 3.0 million tons per year beginning in 1988 and another 3.0 million in 1993 on the basis of these two plants. Of course, the exact timing and the amount of the new tonnages may be affected by construction delays and/or incorrect load forecasts by the utilities.

Combining the existing contracts with the potential new generating plants yields a 1993 estimate of about 41 million tons.

The Long-Run Outlook for Montana Coal

Beyond 1993 there are no electric utility plans upon which to derive forecasts of Montana coal production. We can identify, however, some of the important factors that will influence the coal industry. In each case, there are numerous uncertainties concerning long-term trends.

- **The future growth rate of electricity.** As was discussed earlier, the growth in electricity demand has decreased significantly in the last decade. Current projections for the long-run annual growth in electricity demand are in the 0 to 4 percent range—with many forecasters expecting 2 to 3 percent annual increases.
- **Montana's ability to maintain its coal market area.** Future increases in FOB mine prices, transportation costs, and other factors may change the relative competitiveness of Montana coal. In the next section, evidence is presented that Montana's coal market area may shrink.
- **The renewal of Montana's existing coal contracts.** As will be discussed in the next section, existing contracts may not be renewed.
- **Elimination of the current excess capacity in electricity generation.** Due to the current surplus, electrical generating capacity is expected to grow much slower than demand during the next ten years. By the early 1990s, however, the excess capacity may be eliminated and increases in generating capacity will be more closely related to changes in electricity demand. But, construction delays, changes in growth of demand, and other factors could change significantly the rate at which the excess capacity is eliminated.

- **The use of coal as a fuel source.** Coal is viewed as the preferred source of fuel for generating plants scheduled for the 1990s. No new nuclear generating plants are currently being planned. Cogeneration, solar, and other forms of generation will continue to increase, but moderating energy price increases and other factors suggest these sources will remain a relatively small component of electricity supply. Any change in the outlook for alternative fuels will certainly influence the use of coal to generate electricity.

Even though reliable long-run forecasts of coal production cannot be derived, growth in the coal mining industry would create additional well-paying jobs. These new employment opportunities would help to counterbalance the 1979 to 1983 losses in Montana's economic base. In other words, increased employment and an increase in coal mining could compensate for some of the recent decreases in copper mining, smelting, railroads, and other basic industries.

Table 6

Actual and Projected Demand for Montana Coal by Mining Firm and Purchaser

	Contract Expiration Date	Millions of Tons									
		Actual 1983	1985	1986	1987	1988	1989	1990	1991	1992	1993
Decker Coal Co.		10.30	13.50	13.60	13.50	13.50	13.70	13.70	13.40	13.70	13.70
Commonwealth Edison Co.	1997										
Detroit Edison Co.	2004										
Lower Colorado River Authority	2003										
Knife River Coal Co.		.25	.29	.29	.25	.25	.25	.25	.25	.25	.25
Holly Sugar Co.	1986		.04	.04	0	0	0	0	0	0	0
Montana-Dakota Utilities	1993		.25	.25	.25	.25	.25	.25	.25	.25	.25
Peabody Coal Co.		2.60	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Minnesota Power and Light Co.	1993		3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
NERCO Coal Co. (Spring Creek)		2.10	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
Utility Fuels, Inc.	2004		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
Western Energy Co.		9.50	10.40	10.40	12.20	12.20	12.20	12.20	12.20	12.20	12.20
Upper Peninsula Generating Co.	1999		.30	.30	.30	.30	.30	.30	.30	.30	.30
Colstrip 1 and 2	2009		2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Colstrip 3 and 4	2019		1.80	1.80	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Lake Superior District Power Co.	1995		.10	.10	.10	.10	.10	.10	.10	.10	.10
Northern States Power Co.	1995		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Wisconsin Power & Light Co.	1994		1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Montana Power Co. (Corette)	1989		.30	.30	.30	.30	.30	.30	.30	.30	.30
Westmoreland Resources, Inc.		3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
Northern States Power Co.	1993		2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
Dairyland Power Coop.	1993		.50	.50	.50	.50	.50	.50	.50	.50	.50
Wisconsin Power and Light Co.	1993		.20	.20	.20	.20	.20	.20	.20	.20	.20
Interstate Power Co.	1993		0	0	0	0	0	0	0	0	0
Upper Peninsula Generating Co.	1991		.30	.30	.30	.30	.30	.30	.30	.30	.30
Subtotal, Current Contracts		28.70[1]	33.59	33.69	35.35	35.35	35.55	35.55	35.25	35.55	35.55
Potential New Contracts						3.00	3.00	3.00	3.00	3.00	6.00
Total, Current and Potential Contracts			33.59	33.69	35.35	38.35	38.55	38.55	38.25	38.55	41.55

[1] Includes small mining companies not reported.

Notes: Most coal contracts stipulate maximum and minimum annual tonnages. Figures presented here represent, for the most part, the midpoint between these limits, and may not precisely reflect tonnages for a particular year.

Facing the Realities of Montana's Coal Future

The projections for Montana coal production to 1993 were derived assuming that all existing contracts would be renewed. This, in fact, may not be true. A number of events have taken place or are likely to occur in the next few years, each of which would reduce the competitive position of Montana coal relative to Wyoming coal. (Characteristics of coal production in each state are summarized in table 7.) In terms of the coal market area shown in figure 9, these factors may shift northward the boundary in the Upper Midwest between the Montana and Wyoming coal market area. Utilities formerly buying Montana coal may switch to Wyoming coal when their contracts expire.

Table 7

Montana and Wyoming Coal Production in the Powder River Basin 1984

	Wyoming	Montana
Active mines (1 million tons per year or greater)	13	5
New mines since 1979	4	0
Estimated current excess capacity (tons per year)	60 million	20 million
Rail transportation	BN/C & NW-UP	BN
Current rates, FOB mine including severance taxes	$6-$7/ton	$10-$15/ton

The events which will or may affect Montana production:

- **Scheduled reduction in Wyoming's coal severance tax.** A portion of the Wyoming coal severance tax is allocated to its "Coal Impact Tax Account." When this account reaches $160 million, the severance tax rate applicable to coal will decrease by two percentage points. Extrapolating current trends, this account may exceed $160 million sometime during 1987 or 1988, triggering the reduction in Wyoming's coal severance tax.
- **A second railroad serving Wyoming's coalfields.** The Chicago and North Western Railroad (C & NW) and the Union Pacific Railroad (UP) have combined to offer rail service between Wyoming and the Upper Midwest. The C & NW serves Minneapolis and many areas in southern and central Wisconsin. In some cases, the rail distance from Wyoming is less using the C & NW and UP rather than the Burlington Northern. Also, the new railroad may offer lower rates, perhaps even below its costs, in order to establish its place in the market. Even if BN rates are identical, some utilities may choose to ship on the C & NW to insure rail competition in the future.
- **New Wyoming coal mines closer to Midwest market with higher quality coal.** The Montana coal market picture in figure 9 was based on the assumption that all Wyoming coal was shipped from Gillette and had a heat content of 8,300 BTU/lb. In fact, however, there are several Wyoming mines, both new and existing, located south of Gillette with shorter rail distance to the Upper Midwest markets. Also, the coal in those deposits is rated at about 8,700 BTU/lb. Both factors (shorter rail distance and higher heat content) would shift northward the Upper Midwest boundary of the Montana coal market area.
- **Revised formula to calculate federal coal royalties.** As federal coal lease terms are readjusted (most are for twenty years), the formula used to calculate royalties is being changed from a flat amount per ton to a percentage of the minemouth "value" of the coal. The minemouth "value" includes the relevant severance taxes. Since our coal has a higher "value," this change in formula will increase the FOB mine price of Montana coal relative to Wyoming coal.
- **Increases in mining and other costs work to the disadvantage of Montana coal.** The average minemouth price for coal in Montana, excluding severance taxes, is greater than for coal mined in Wyoming. Equal *percentage* increases in both Montana and Wyoming minemouth coal prices (perhaps due to similar changes in labor costs) would result in a greater *absolute* increase in the price of Montana coal. For example, a 20 percent increase in $10 a ton coal is $2.00, while a similar rise for $7.00 a ton is $1.40. The greater absolute increase in minemouth prices leads to a reduction in the market area of the higher-priced Montana coal.

These factors cannot yet be quantified to estimate the northward shift in the boundary between the Montana and Wyoming coal market areas. There is, however, indirect evidence that the boundary is in fact shifting northward.

- Northern States Power Company, located in southern Minnesota and northwest Wisconsin, has recently announced the purchase of Wyoming coal for existing electric generating plants. It will be delivered to the Minneapolis area via the C & NW and UP railroads.

- Interstate Power Company of northern Iowa and Wisconsin Power and Light Company in southern Wisconsin have both reduced their purchase of Montana coal by exercising "take or pay" provisions of their contracts.

In all three cases, there were a number of factors involved. None was a simple substitution of Wyoming coal for Montana coal. These examples do, however, point out that electric utilities on the fringes of Montana's coal market area are reevaluating their use of Montana coal.

A relatively small northward shift in the midwest boundary of our market area could have a significant impact on Montana's future coal production. As shown in tables 5 and 6, there are five major coal contracts with utilities in southern Minnesota and Wisconsin, and all are scheduled to expire in 1995 or earlier. In addition, the two potential new contracts for electric generating plants are also in southern Minnesota and Wisconsin.

If none of the contracts is renewed, Montana coal mines could lose about 15.4 million tons per year. The three southern Wisconsin contracts (with Dairyland Power Cooperative and Wisconsin Power and Light Company) total about 2.5 million tons per year. The two existing contracts with Northern States Power Company plus the two potential new contracts total approximately 12.9 million tons per year.

The loss of 15 million tons per year translates into at least a $30 million reduction in coal severance tax collections and a decrease of 300 to 500 in coal mining employment. Labor income in coal mining would decline by $10-$18 million per year. All of the lost jobs and income will be in Montana because none of the affected contracts are with mines located near the Wyoming border.

Montana can maintain its coal market area by reducing the delivered price of coal. This may help to forestall the potential loss of contracts in the Upper Midwest. The delivered price of Montana coal can be reduced by decreasing coal mining costs, the Montana coal severance tax, and/or rail transportation costs.

A $1 a ton reduction in the delivered price of Montana coal (from any source) translates into about fifty additional rail miles at $.02 per ton mile. A $3 a ton reduction would lead to about 150 additional rail miles. The mileages may appear insignificant compared to the distances between Montana and the Midwest, but an additional 100 miles or so in southern Minnesota and Wisconsin can make the difference for a number of large utilities purchasing millions of tons of coal.

Conclusion: What Can be Done to Prevent Another Reduction in Montana's Economic Base?

Montana suffered permanent losses in its economic base between 1979 and 1983 due to shutdowns and closures. These losses of jobs and income are not likely to be replaced in the near future. There may be a further erosion of the state's economic base due to cutbacks in coal mining. Events which have already occurred or are likely to take place in the next few years may lead to a shrinking of Montana's midwest coal market area and the possible loss of one-third of the state's coal production. This translates into 300 to 500 fewer well-paying noncyclic and nonseasonal jobs with labor income of $10 to $18 million per year. The potential losses in coal mining would add to and compound the effects of the decreases in copper mining, smelting, railroads, and other basic industries.

Montana may be able to maintain its coal market area by reducing mining costs, the coal severance tax, and/or rail transportation costs. A $1 to $3 a ton reduction, for example, in any combination of these factors, could increase the competitiveness of Montana coal in the markets of southern Minnesota and Wisconsin.

Quick action will help to maintain Montana's coal market area. A number of major coal contracts are scheduled to expire in the early 1990s, and the utilities involved may now be evaluating alternative sources of coal. In addition, some utilities are now selecting sites for yet-to-be announced generating plants to be built after 1993. Prompt reductions in mining costs, the coal severance tax, and/or rail transportation costs will improve the competitive position of Montana coal in midwestern states.

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